

DIS2011

Electroweak Physics and Beyond the Standard Model Parallel Session IX, Thursday 14th of April 2011, 16:30-18:15

Title: Fourth Generation Leptons from LEP to LHC

Linda Carpenter (UC Irvine)

I analyze a fourth generation lepton sector in which the lightest particle is a Majorana neutrino. In this scenario fourth generation neutrinos have both a Dirac and Majorana mass, resulting in two Majorana neutrino mass eigenstates. A reanalysis of LEP's lower mass bound is performed on Majorana neutrinos for direct searches. I also extrapolate LEP's SUSY squark search with a 2 jet plus missing missing energy final state to the production and decay of a pair of heavy Majorana neutrinos; here it is expected that significant regions of the neutrino mass plane may be ruled out. Finally, search strategies are proposed for heavy fourth generation neutrino pairs and charged leptons at LHC.

Title: Search for Squarks in R-parity Violating Supersymmetry in ep Collisions at HERA

TBA

A search for squarks in R-parity violating super-symmetry is performed in ep collisions at HERA using the H1 detector. The full data sample taken at a centre-of-mass energy $\sqrt{s} = 319$ GeV is used for the analysis, corresponding to an integrated luminosity of 255 /pb of e^+p and 183 /pb of e^-p collision data. The resonant production of squarks via a Yukawa coupling λ' is considered, taking into account direct and indirect R-parity violating decay modes. Final states with jets and leptons are investigated. No evidence for squark production is found and mass dependent limits on λ' are obtained in the framework of the Minimal Supersymmetric Standard Model and in the Minimal Supergravity Model. In the considered part of the parameter space, for a Yukawa coupling of electromagnetic strength $\lambda' = 0.3$, squarks of all flavors are excluded up to masses of 275 GeV at 95% confidence level, with down-type squarks further excluded up to masses of 290 GeV.

Title: Search for Lepton Flavor Violation at HERA

TBA

A search for the lepton flavor violating processes $ep \rightarrow \mu X$ and $ep \rightarrow \tau X$, mediated by leptoquarks, is performed with the H1 experiment at HERA. Final states with a muon or tau and a hadronic jet are searched for. This search uses all HERA data collected by the H1 experiment, at a centre-of-mass energy of 320 GeV and corresponding to an integrated luminosity of about 0.5 /fb. No evidence for lepton flavor violation is found. Limits are derived on the mass and the couplings of leptoquarks inducing lepton flavor violation in an extension of the Buchmüller – Ruckl - Wyler effective model.

Title: Searches for lepton flavour and lepton number violation in kaon decays at CERN

Mauro Raggi (contact Cristina Lazzeroni <christina.lazzeroni@cern.ch>)

Searches for lepton flavor and lepton number violation in kaon decays by the CERN NA48 and NA62 experiments are reported. A new measurement of the helicity suppressed ratio of charged kaon leptonic decay rates to sub-percent precision at the CERN NA62 experiment is presented. The strong suppression and the high precision of the SM expectation provide a unique sensitivity

to deviations from lepton universality arising in multi-Higgs new physics models. A new upper limit on the $K^+ \rightarrow \pi^- \mu^+ \mu^+$ decay rate from the CERN NA48 experiment is presented, which translates into the most stringent direct constraint on the corresponding effective Majorana neutrino mass, and can be used to constrain SUSY models.